Proposal

for

Tracing Projector

BAUSCH & LOMB INCORPORATED
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June 28, 1961

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Proposal

Tracing Projector

This proposal describes a tracing table for the transference of information from segments of aerial photographs to tracing material. The photographic detail is projected, at variable magnification, onto the tracing material which is placed over a horizontal working area.

A primary design goal has been equipment simplicity coupled with satisfactory operational ability. No attempt has been made to incorporate the possible automatic, but expensive, devices and couplings which would lead to more automatic operation. Operational evaluation of the simple instrument proposed will develop data to determine the desireability of a more sophisticated system for the future.

A direct approach considered consistent with the preceding consists of modifying an Omega model D-2 enlarger to become the lighthouse and film gate assembly. Three, turret mounted, projection lenses will be required to cover the range desired while maintaining a reasonable overall instrument size. The base of the tracing table provides support for projection mechanism, the working surface and an adjustable mirror assembly. Controls for the adjustable elements are grouped, according to the mechanical function affected, near the projection head

assembly.

Operator access to three sides of the working area is possible. An auxiliary work surface, table or cabinet, can be placed in any location considered convenient to the operator.

Specifications

Overall Size: The tracing table top will be 32x42 inches located 40 inches above the floor. The projector-lamphouse assembly is to be located centrally at one end with the guide beams extending beyond the table top. The guide rails extend upward 24 inches from the table top.

Optical: Three turret mounted lenses provide magnification ranges of 2 to 4.8X, 4 to 9X and 8 to 16X. The magnification is adjustable within each range providing complete coverage. The lenses required to produce 6 line/mm resolution on the working surface are described as 12" f/10, 7" f/6 and 4" f/4. Bausch & Lomb has an adequate stock of lenses to allow selection of a lens for each application.

Distortion in the projected image is difficult to define or measure due to the variable magnification ability, however, the distortion of a projected grid pattern shall be such that the image of any straight line of the grid will be straight within ±1/32" at

magnifications of 6X or less and within ±1/16" at those greater than 6X.

At magnifications of 6X or less the projection format or film gate will be a square 4 inches on a side, at greater magnifications the 24 inch square work area will be filled. The operator controlled illumination level shall provide comfortable operation in a 5 ft. candle ambient light environment with a 1.0 density transparency projected onto a frosted acetate or Mylar tracing material.

Mechanical: All adjustments are physically independent and mechanically operated, they are grouped near the projector assembly mount area. These controls include two functionally interdependent focus and magnification hand cranks, iris diaphragm and electrical dimming controls and a three position lens selector slide. Locks will be provided where appropriate.

The instrument will be designed and constructed to be of comparable rigidity to a good quality drafting table.

A 4"x4" film gate with external clearance to allow the excess film, from a 9"x18" chip for example, to hang loose outside the film gate is proposed. Stage and pressure glasses will assure a flat film in the gate area.

(3) — Large enough?

(4)

The film gate opens wide enough to permit visual study of the material to be projected while it is being loaded. A more precise orientation can be accomplished while viewing the projected image and slipping the film in the film gate before clamping same.

An auxiliary blower will be incorporated to protect the film from excessive temperatures if the need arises. A 25°F rise over 80°F ambient is an acceptable limit.

Summary

It should be pointed out that the proposed dimensions and component specifications as described are approximate, the exact dimensions and components used will be specified during the design phase. No degradation of operational performance will result from these detail considerations.

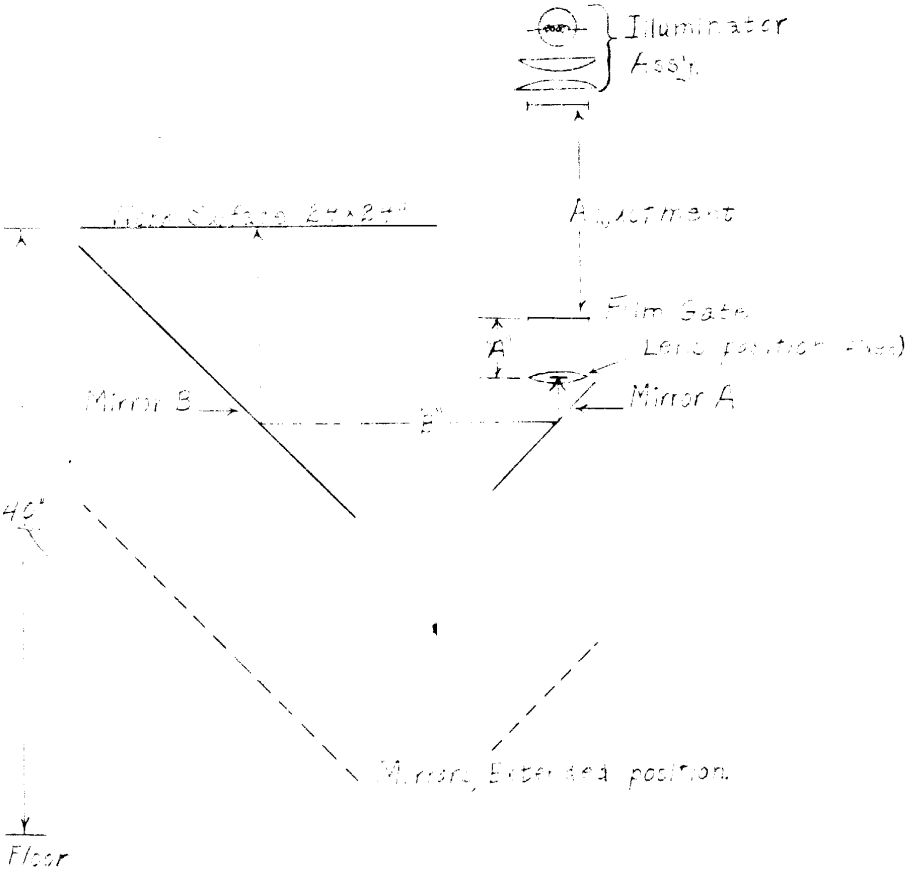
The instrument proposed and pictured in Figure 1 is considered completely adequate as a prototype of a tracing projector for the purpose intended.

25X1A

[redacted]:ms

June 28, 1961

TRACING PROJECTOR



Mag.	Lens	A	B
[illegible]	[illegible]	18"	36"
1.33x	12	13.25"	79"
4.0x	7"	8.75	36"
9.0x	7"	7.1"	70"
8.0x	4"	4.7"	36"
16.5x	4"	4.25	70"

[illegible]

Fig. 2.